COMMERCIAL WASHERS, MODELS CAE2745, CAE2765, CAE2795, QCAE2735, MAT20CS, MAT20MN

⚠ DANGER

Electrical Shock Hazard

Only authorized technicians should perform diagnostic voltage measurements.

After performing voltage measurements, disconnect power before servicing.

Failure to follow these instructions can result in death or electrical shock.

⚠ WARNING

Electrical Shock Hazard

Disconnect power before servicing.

Replace all parts and panels before operating.

Failure to do so can result in death or electrical shock.

Voltage Measurement Safety Information

When performing live voltage measurements, you must do the following:

- Verify the controls are in the off position so that the appliance does not start when energized.
- Allow enough space to perform the voltage measurements without obstructions.
- Keep other people a safe distance away from the appliance to prevent potential injury.
- Always use the proper testing equipment.
- After voltage measurements, always disconnect power before servicing.

IMPORTANT: Electrostatic Discharge (ESD) Sensitive Electronics

ESD problems are present everywhere. Most people begin to feel an ESD discharge at approximately 3000V. It takes as little as 10V to destroy, damage, or weaken the main control assembly. The new main control assembly may appear to work well after repair is finished, but a malfunction may occur at a later date due to ESD stress.

- **Use an anti-static wrist strap. Connect wrist strap to green ground connection point or unpainted metal in the appliance**

  – OR –

  Touch your finger repeatedly to a green ground connection point or unpainted metal in the appliance.
- **Before removing the part from its package, touch the anti-static bag to a green ground connection point or unpainted metal in the appliance.**
- **Avoid touching electronic parts or terminal contacts; handle electronic control assembly by edges only.**
- **When repackaging main control assembly in anti-static bag, observe above instructions.**

IMPORTANT SAFETY NOTICE — "For Technicians only"

This service data sheet is intended for use by persons having electrical, electronic, and mechanical experience and knowledge at a level generally considered acceptable in the appliance repair trade. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible, nor assume any liability for injury or damage of any kind arising from the use of this data sheet.

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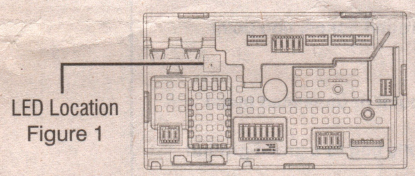
DIAGNOSTIC GUIDE

Before servicing, check the following:

- Make sure there is power at the wall outlet.
- Has a fuse blown or circuit breaker tripped? Was a regular fuse used? A time-delay fuse is required.
- Are both hot and cold water faucets open and water supply hoses unobstructed?
- All tests/checks should be made with a VOM (volt-ohm-milliammeter) or DVM (digital-voltmeter) having a sensitivity of 20,000 Ω per volt DC or greater.
- Resistance checks must be made with washer unplugged or power disconnected.
- **IMPORTANT:** Avoid using large diameter probes when checking harness connectors as the probes may damage the connectors upon insertion.
- Check all harnesses and connections before replacing components. Look for connectors not fully seated, broken or loose wires and terminals, or wires not pressed into connectors far enough to engage metal barbs.
- A potential cause of a control not functioning is corrosion or contamination on connections. Use an ohmmeter to check for continuity across suspected connections.

DIAGNOSTIC LED – MAIN CONTROL

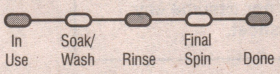
A troubleshooting tool has been implemented onto the main control board—a diagnostic LED.
LED ON – The Control is detecting correct incoming line voltage and the processor is functioning.
LED OFF – No power to control or control malfunction. Perform TEST #1: Main Control, page 12, to verify main control functionality.



FAILURE MODE

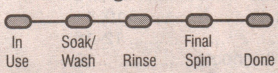
If the incoming water supply is restricted or off, the cycle will end and the following 3 LEDs will be lit. Opening and closing the lid will reset the control to the beginning of a new cycle. Money from the cancelled cycle will be lost. The incoming water supply needs to be corrected prior to starting the next cycle or the risk of another cancelled cycle is high.

- "In Use, Rinse, & Done" LEDs On



All 5 LEDS lit and not flashing indicates that the washer is out of service. Enter the Service Diagnostic Test Modes and then enter Fault Code Display Mode to determine the mode of failure and to reset the control.

- All 5 LEDs On and Not Flashing



SERVICE DIAGNOSTIC TEST MODES

These tests allow factory or service personnel to test and verify all inputs to the main control board. Utilize these performance tests before continuing to specific component troubleshooting tests.

ACTIVATING THE SERVICE DIAGNOSTIC TEST MODES

1. Be sure the washer is in standby mode (plugged in with all indicators off).
2. Perform the following sequence of movement using the cycle selector knob.

NOTE: AFTER RESET, sequence "a" through "e" must be completed within **6 seconds**, stopping just briefly between each click (resulting in the following sequence: Left - Right - Right - Left - Right, as indicated below).

RESET - Place cycle selector knob pointer at 12 o'clock position and wait 3–4 seconds before proceeding.

a. Rotate cycle selector knob **counterclockwise** one click.

b. Rotate cycle selector knob **clockwise** one click.

c. Rotate cycle selector knob **clockwise** one click.

d. Rotate cycle selector knob **counterclockwise** one click.

e. Rotate cycle selector knob **clockwise** one click.

➢ Successful activation of Diagnostic Test Modes will be indicated by all status LEDs (except for Lid Locked) flashing ON and OFF in half-second intervals. **NOTE:** LED names may vary between makes and models.

Legend: = ON = OFF

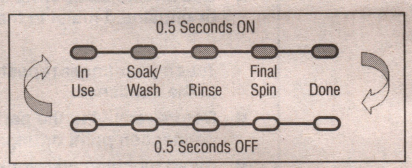


Figure 2 - Status LEDs flashing ON and OFF

➢ If the status LEDs do not display as described above, the sequence may not have been completed within 6 seconds. Repeat step 2 to ensure this was not the cause. If still unsuccessful, see Unsuccessful Entry, page 3.

3. There are several accessible Diagnostic Test Modes shown in the chart below. To select the desired Mode of Operation, toggle the cycle selector knob left and right one click in each direction, advancing through the Test Modes until the status LEDs match the mode desired to enter.

DIAGNOSTIC TEST MODES				
MODE	STATUS LEDs			
(Status LED names may vary between makes and models)	SOAK/ WASH	RINSE	FINAL SPIN	DONE
Fault Code Display Mode				1
Quick Overview Test Mode			2	
Manual Overview Test Mode			2	1
Calibration Mode		4		
Drain & Spin Cycle		4		1
UI Test Mode		4	2	
SW Version Display Mode		4	2	1
Factory Diagnostics Mode	8			
Tachometer Verification Mode	8			1
Dry Factory Diagnostics	8		2	
Factory Cal Test Cycle	8		2	1
Clean Washer Cycle	8	4		

4. Press the **START** button to enter desired mode of operation.

Refer to the following pages for detailed information on each mode of operation:

- **FAULT CODE DISPLAY MODE:** Page 3
- **QUICK OVERVIEW TEST MODE:** Page 4
- **MANUAL OVERVIEW TEST MODE:** Page 4
- **CALIBRATION MODE:** Page 4
- **DRAIN & SPIN CYCLE:** Page 4
- **UI TEST MODE:** Page 4
- **SW VERSION DISPLAY MODE:** Page 5
- **FACTORY DIAGNOSTICS:** If accessed, washer must be recalibrated (see Calibration Mode)
- **TACHOMETER VERIFICATION MODE:** Page 5
- **DRY FACTORY DIAGNOSTICS:** Page 5
- **FACTORY CALIBRATION TEST MODE:** Page 5
- **CLEAN WASHER CYCLE:** Page 5

Unsuccessful Entry

If entry into diagnostic test mode is unsuccessful, refer to the following indication and action:

Indication: None of the LEDs turn on.

Action: Press **START** button to enter setting mode.

- ➢ If indicators come on, repeat steps 1 through 4 of Activating the Service Diagnostic Modes. **NOTE:** Rotating the dial too fast or too slow will affect entry.
- ➢ If no indicators come on after pressing the **START** button, go to TEST #1, page 12.

EXITING THE SERVICE DIAGNOSTIC TEST MODES

Press and hold the **START** button for 3 seconds at any time to exit diagnostic test modes.

Washer will exit diagnostic test modes after 5 minutes of inactivity or unplugging the power cord.

FAULT CODE DISPLAY MODE (Pgs 6–7)

To access fault/error codes, perform steps 1 and 2 of Activating the Service Diagnostic Test Modes. Turn the cycle selector knob until the status LEDs correspond as follows:

- "Done" LED On

Press the **START** button to enter Fault Code Display Mode. The status LEDs flash on and off.

1. To view last 4 fault codes:
   - ➢ Toggle cycle selector knob to view fault codes in the order of most recent to oldest. (Refer to Fault/Error Code charts on pages 6 & 7.)

     NOTE: If only the In Use LED flashes ON and OFF, there are no fault codes logged in the memory.

     NOTE: A fault/error code will be removed from memory if it does not reoccur after 10 consecutive wash cycles.
2. To exit Fault Code Display Mode:
   - ➢ Toggle cycle selector knob until the status LEDs flash ON and OFF (see figure 2, page 2).
   - ➢ Press and hold the **START** button for 3 seconds to exit Fault Code Display Mode.

Fault/Error Code Display Method

Fault/error codes are displayed by alternating the state of the Status LEDs in one second intervals. All fault/error codes have an F# and an E#. The F# indicates the suspect System/ Category and the E# indicates the suspect Component system.

If the In Use LED is **ON**, the **Fault Number** is represented; if **OFF**, the **Error Number** is represented (see example below). The remaining LEDs (Soak/Wash, Rinse, Final Spin, and Done) represent the fault and error code in binary. (See Fault/Error Code Charts on pages 6 & 7 for more information.) ▭ = ON.

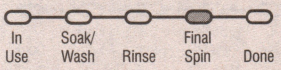
Frame Number	STATUS LEDs					Fault Code	STATUS LEDs					Error Code
	IN USE	SOAK/WASH	RINSE	FINAL SPIN	DONE		IN USE	SOAK/WASH	RINSE	FINAL SPIN	DONE	
1	F	8	4	2	1	**F2**						
2												
3							E	8	4	2	1	**E3**
4												
Repeat...												

LED names may vary between makes and models.

QUICK OVERVIEW TEST MODE (Page 8)

To access Quick Overview Test Mode, perform steps 1 and 2 of Activating the Service Diagnostic Test Modes. Toggle the cycle selector knob until the status LEDs correspond as follows:

- "Final Spin" LED On



NOTE: Status LED names may vary between makes and models.

Press the **START** button to begin the Quick Overview test. See page 8 for order of Quick Overview test.

- Upon entering the Quick Overview test mode, the washer will perform an automatic test with water cycles to check major washer functions.
- Pressing the **START** button will manually advance to the next step.
- Press and hold the **START** button for 3 seconds at any time to exit any test mode.

IMPORTANT: Lid must be closed with lid lock enabled to perform test.

MANUAL OVERVIEW TEST MODE (Page 9)

To access Manual Overview Test Mode, perform steps 1 and 2 of Activating the Service Diagnostic Test Modes. Toggle the cycle selector knob until the status LEDs correspond as follows:

- "Final Spin & Done" LEDs On

Press the **START** button to enter Manual Overview Test Mode. See page 9 for Manual Overview Test Mode.

- Upon entering the Manual Overview test mode, the washer will have all outputs OFF.
- The cycle selector knob is used to select the output to be tested.
- The **START** button will activate/deactivate the selected output.
- When the selected output is activated, the corresponding status LEDs flash ON & OFF.
- Press and hold the **START** button for 3 seconds at any time to exit any test mode.

IMPORTANT: As a safety feature, the lid must be closed with lid lock enabled to activate either Agitate or Spin Test.

NOTE: Multiple outputs may be activated simultaneously.

NOTE: Outputs left on will time-out after 5 minutes.

CALIBRATION MODE

IMPORTANT: Calibration must be performed when any of the following components have been replaced: Main Control, Basket, Drive Assembly, Suspension, Motor, and Capacitor. Calibration should also be performed when the washer is moved to a different location or, more specifically, to a different power outlet. Not performing calibration may result in poor wash performance.

To access Calibration Mode, perform steps 1 and 2 of Activating the Service Diagnostic Test Modes. Toggle the cycle selector knob until the status LEDs correspond as follows:

- "Rinse" LED On

NOTE: Status LED names may vary between makes and models.

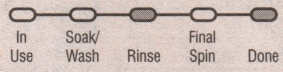
Press the **START** button to begin washer calibration. All status LEDs will turn on.

- Do **NOT** interrupt calibration, disturb washer, or remove power; otherwise, calibration must be repeated.
- Lid must be down to perform test.
- Basket must be empty to perform test (no water or clothes).
- Calibration cycle runs for approximately 2–4 minutes. Cycle completes when door unlocks and washer enters standby mode.

DRAIN & SPIN CYCLE

To access the Drain & Spin Cycle, perform steps 1 and 2 of Activating the Service Diagnostic Test Modes. Toggle the cycle selector knob until the status LEDs correspond as follows:

- "Rinse & Done" LEDs On

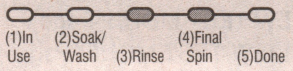


Press the **START** button to start the Drain & Spin Cycle.

UI TEST MODE

To access UI (User Interface) Test Mode, perform steps 1 and 2 of Activating the Service Diagnostic Test Modes. Toggle the cycle selector knob until the status LEDs correspond as follows:

- "Rinse & Final Spin" LEDs On



NOTE: Status LED names may vary between makes and models. Use LED # identifications.

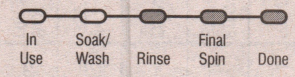
Press the **START** button to begin the UI test.

- Upon entering the UI test mode, all status LEDs will be turned ON.
- Pressing the **START** button will turn on and off all status LEDs, or toggle the state of each status LED independently. (Example: if 2 are on, and 3 are off, then 2 will be turned off and 3 turned on.)
- When toggling the cycle selector knob, each double click will toggle the "Done" (5) LED.
- Turning the rotary switch will toggle the following status LED on and off.
  - (1) In Use LED
- Press and hold the **START** button for 3 seconds.
- Washer will exit UI test mode after 5 minutes of inactivity or unplugging the power cord.

SOFTWARE VERSION DISPLAY MODE

To access Software Version Display Mode, perform steps 1 and 2 of Activating the Service Diagnostic Test Modes. Toggle the cycle selector knob until the status LEDs correspond as follows:

- "Rinse, Final Spin, and Done" LEDs On



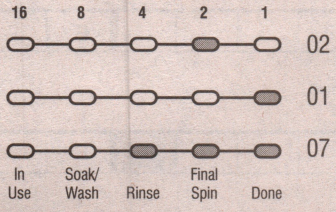
NOTE: Status LED names may vary between makes and models.

Press the **START** button to begin software display mode.

- Upon entering the software version display mode, the Major, Minor, and Test version numbers for the software are displayed by alternating the state of the Status LEDs in one second intervals; the process repeats following a pause.

  To calculate the number being displayed, add the representative numbers together that are displayed at the same time; see chart below for representative numbers.

  For example, if the s/w version is 02.01.07, the following sequence would be displayed:



- Press and hold the **START** button for 3 seconds at any time to exit software version display mode.

FACTORY DIAGNOSTICS

This is for factory use only, as it runs the Factory Cycle Template for testing the washer before it leaves the factory.

TACHOMETER VERIFICATION MODE

To access Tachometer Verification Mode, perform steps 1 and 2 of Activating the Service Diagnostic Modes. Toggle the cycle selector knob until the status LEDs correspond as follows:

- "Soak/Wash and Done" LEDs On

NOTE: Status LED names may vary between makes and models.

Press the **START** button to begin tachometer verification mode.

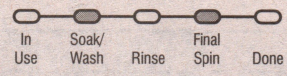
- Tachometer verification uses the status LEDs to represent the tachometer frequency (basket RPM).

  For example, **slowly** turn the basket by hand; as the basket turns, the DONE, FINAL SPIN, RINSE, and SOAK/WASH status LEDs will illuminate one at a time in a visually repeating cycle. The LED timing is derived from the tachometer signal itself.

- Press and hold the **START** button for 3 seconds at any time to exit tachometer verification mode.

DRY FACTORY DIAGNOSTICS

This cycle is used by the factory to gather data for setting the proper algorithms. This cycle is the same for all washers and may indicate that some switches or valves are actuated that are not used. Toggle the cycle selector knob until status LEDs correspond as follows:

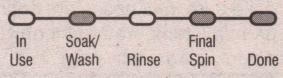


NOTE: This cycle should not be used as a field diagnostic test.

- While running the Dry Factory cycle, the control is also enabling the UI Diagnostics test.

FACTORY CALIBRATION TEST

This cycle is used by the factory to test functions and intervals specifically for functionality testing of specific components and gathering data. Toggle the cycle selector knob until status LEDs correspond as follows:



NOTE: This cycle should not be used as a field diagnostic test.

CLEAN WASHER CYCLE

Puts washer into the Washer Cleanout Cycle. To access the Clean Washer Cycle, perform steps 1 and 2 of Activating the Service Diagnostic Test Modes. Toggle the cycle selector knob until status LEDs correspond as follows:

NOTE: This cycle should not be used with anything still loaded in the wash basket.

CUSTOMER VIEWABLE FAULT CODES

There are 3 fault codes that may be visible to the customer indicated by the following Status LEDs:

- SOAK/WASH LED ON (Long Fill Fault) – Refer to "No Fill, Long Fill" on page 7 for information.
- FINAL SPIN LED ON (Long Drain Fault) – Refer to "Long Drain" on page 7 for information.
- LID LOCKED LED FLASHING CONTINUOUSLY (Lid Lock Fault) – Refer to "Lid Lock Fault" on page 6 for information.

FOR MORE INFORMATION ON SERVICE FAULT AND ERROR CODES, CONTINUE TO PAGES 6 AND 7

FAULT/ERROR CODES — See page 3 to access Fault Code Display Mode. ■ = ON

FAULT/ERROR CODE – DESCRIPTION Explanation & Recommended Procedure (Status LED names may vary between makes and models)	FAULT NUMBER Status LEDs					ERROR NUMBER Status LEDs				
	IN USE	SOAK/ WASH	RINSE	FINAL SPIN	DONE	IN USE	SOAK/ WASH	RINSE	FINAL SPIN	DONE
F0E0 – NO FAULT	On	8	4	2	1	Off	8	4	2	1
F0E2 – OVER SUDS CONDITION DETECTED	F					E			2	
Fault is displayed when Suds prevent the basket from spinning up to speed or the pressure sensor detects rising suds level. The main control will flush water in attempt to clear Suds. If the water flush is unable to correct the problem, this may indicate: • Not using HE detergent. • Excessive detergent usage. • Check pressure hose connection from tub to pressure sensor. Is hose pinched, kinked, plugged, or leaking air? • Mechanical friction on drive mechanism or basket. (Clothing between basket and tub.)										
F0E4 – HIGH WATER TEMPERATURE – RINSE CYCLE	F					E		4		
Fault is displayed when washer detects water temperature 105°F (41°C) or higher during rinse cycle. • Hot water getting in. Make sure inlet hoses are connected correctly. • If hoses are installed properly, temperature thermistor may be stuck in low resistance range. • See TEST #5: Temperature Thermistor, page 16.										
F0E5 – OFF BALANCE LOAD DETECTED	F					E		4		1
Fault is displayed when an off balance condition is detected. • Check for weak suspension. Basket should not bounce up and down more than once when pushed. • Clothing should be distributed evenly when loading.										
F1E1 – MAIN CONTROL FAULT	F				1	E				1
Indicates a main control fault. • See TEST #1: Main Control, page 12.										
F1E2 – MOTOR CONTROL FAULT	F				1	E			2	
Indicates a fault of the motor control section of the main control. • See TEST #3b: Drive System – Motor, page 14.										
F2E1 – STUCK KEY	F			2		E				1
The START key has been actuated for 10 consecutive minutes. • Fault occurs during Diagnostic Test Mode if a stuck key is detected. • See TEST #4: Console and Indicators, page 16.										
F2E3 – MISMATCH OF MAIN CONTROL & UI	F			2		E			2	1
The User Interface identification does not match the expected value in the Main Control Board. • Fault occurs during Diagnostic Test Mode if a mismatch of main control and UI is identified. • See TEST #4: Console and Indicators, page 16.										
F3E1 – PRESSURE SENSOR FAULT	F			2	1	E				1
Fault is displayed when the Main Control detects an out of range pressure signal. • Check pressure hose connection from tub to pressure sensor. Is hose pinched, kinked, plugged, or leaking air? • See TEST #6: Water Level, page 17.										
F3E2 – INLET WATER TEMPERATURE FAULT	F			2	1	E			2	
Fault is displayed when the Inlet Thermistor is detected to be open or shorted. • See TEST #5: Temperature Thermistor, page 16.										
F5E1 – LID SWITCH FAULT	F		4		1	E				1
Fault is displayed if lid is in locked state, but lid switch is open. • User presses START with lid open. • The main control cannot detect the lid switch opening and closing properly. • See TEST #8: Lid Lock, page 18.										
F5E2 – LID LOCK FAULT	F		4		1	E			2	
Fault is displayed if Lid Lock has not moved into locked position or motor cannot be powered. • Lid is not closed completely due to interference. • Check for lock interference with lock striker. • Wash media buildup (detergent, lint, etc.) is preventing the lock mechanism from sliding. • Main control detects open lid switch when attempting to lock. • Main control cannot determine if lid lock is in a locked state. • See TEST #8: Lid Lock, page 18.										

NOTE: If the In Use LED is **ON**, the fault code is represented; if **OFF**, the error code is represented.

FAULT/ERROR CODES (cont.) — See page 3 to access Fault Code Display Mode. ■ = ON

FAULT/ERROR CODE – DESCRIPTION	FAULT NUMBER					ERROR NUMBER				
	Status LEDs					Status LEDs				
Explanation & Recommended Procedure (Status LED names may vary between makes and models)	IN USE	SOAK/ WASH	RINSE	FINAL SPIN	DONE	IN USE	SOAK/ WASH	RINSE	FINAL SPIN	DONE
F5E3 – LID UNLOCK FAULT	F	8	4	2	1	E	8	4	2	1
Fault is displayed if Lid Lock has not moved into unlocked position or motor cannot be powered. • Check for lock interference with lock striker. • Main control cannot determine if lid lock is in an unlocked state. • See TEST #8: Lid Lock, page 18.										
F5E4 – LID NOT OPENED BETWEEN CYCLES	F		4		1	E		4		
Fault is displayed if the following conditions occur: • User presses START after several consecutive washer cycles without opening lid. • See TEST #8: Lid Lock, page 18.										
F7E1 – BASKET SPEED SENSOR FAULT	F		4	2	1	E				1
Fault is displayed when the main control cannot determine speed of basket, or speed changes too quickly. • Locked rotor—check that basket, impeller, and motor can rotate freely. • Check harness connections from main control to motor and shifter. • See TEST #3a: Drive System – Shifter, page 13.										
F7E5 – SHIFTER FAULT	F		4	2	1	E		4		1
Fault is displayed when the main control cannot determine position of shifter. • Check harness connections from main control to motor and shifter. • Observe shifter operation. • See TEST #3a: Drive System – Shifter, page 13.										
F7E6 – MOTOR FAULT	F		4	2	1	E		4	2	
Indicates an open clockwise or counterclockwise circuit of the motor. • See TEST #3b: Drive System – Motor, page 14.										
F7E7 – MOTOR UNABLE TO REACH TARGET RPM	F		4	2	1	E		4	2	1
Fault is displayed when basket speed sensor detects that target RPM was not reached. • Mechanical friction on drive mechanism or basket (clothing between basket and tub). • Weak motor or run capacitor, or no connection to run capacitor. • Load off balance. Clothing should be distributed evenly when loading. • See TEST #3b: Drive System – Motor, page 14.										
F8E1 – LONG FILL	F	8				E				1
Fault is displayed when the water level does not change for a period of time OR water is present but main control does not detect the water level changing. Opening and closing the lid will clear the error being displayed. • Is water supply connected and turned on? • Low water pressure; fill times longer than six minutes. Are hose screens plugged? • Check for proper drain hose installation. Is water siphoning out of the drain hose? • Drain hose must not be more than 4.5" (114 mm) into the drain pipe. • Check pressure hose connection from tub to pressure sensor. Is hose pinched, kinked, plugged, or leaking air? • See TEST #2: Valves, page 13.										
F8E3 – OVERFLOW CONDITION	F	8				E			2	1
Fault is displayed when main control senses water level that exceeds the washer's capacity. • May signify problem with inlet water valves. • Check pressure hose connection from tub to pressure sensor. Is hose pinched, kinked, plugged, or leaking air? • Check for an onboard pressure transducer fault. • Not pumping—pressure transducer closed or shorted in standby, or after washer completes a cycle. • See TEST #2: Valves, page 13 and TEST #6: Water Level, page 17.										
F8E5 – HOT, COLD REVERSED	F	8				E		4		1
Fault is displayed when the hot and cold inlet hoses are reversed. • Make sure inlet hoses are connected correctly. • If hoses are installed properly, temperature thermistor may be stuck in low resistance range. • See TEST #2: Valves, page 13 and TEST #5: Temperature Thermistor, page 16.										
F8E6 – NO FILL	F	8				E		4	2	
Fault is displayed when the water level does not change for a period of time OR water is present but main control does not detect the water level changing. Opening and closing the lid will clear the error being displayed. • Is water supply connected and turned on? • Low water pressure; fill times longer than six minutes. Are hose screens plugged? • Check for proper drain hose installation. Is water siphoning out of the drain hose? • Drain hose must not be more than 4.5" (114 mm) into the drain pipe. • Check pressure hose connection from tub to pressure sensor. Is hose pinched, kinked, plugged, or leaking air? • See TEST #2: Valves, page 13.										
F9E1 – LONG DRAIN	F	8			1	E				1
Fault is displayed when the water level does not change after the drain pump is on for 10 minutes. • Is the drain hose or the drain pump clogged? Check tub sump under impeller for obstructions. • Is the drain hose height greater than 96" (2.4 m)? • Check pressure hose connection from tub to pressure sensor. Is hose pinched, kinked, plugged, or leaking air? • Is the pump running? If not, see TEST #7: Drain Pump, page 17.										

NOTE: If the In Use LED is **ON**, the fault code is represented; if **OFF**, the error code is represented.

QUICK OVERVIEW TEST MODE — See page 4 to access Quick Overview Test Mode. ■ = ON

Press the **START** button to begin the Quick Overview Test. **IMPORTANT:** Lid must be closed and locked to perform Quick Overview Test.

FUNCTION	STATUS LEDs					Est. TIME
Recommended Procedure	SOAK/ WASH	RINSE	FINAL SPIN	DONE	LID LOCKED	In Seconds
LID WILL LOCK				1	On	1
Motor must be at "0" RPM. If lid does not lock, go to Manual Overview Test: Lid Lock, page 9.						
COLD VALVE WILL ACTUATE			2		On	60
If water is not present, or temperature is wrong, go to Manual Overview Test: Cold Valve, page 9.						
HOT VALVE WILL ACTUATE			2	1	On	10
If water is not present, or temperature is wrong, go to Manual Overview Test: Hot Valve, page 9.						
SHIFTER MOVES TO AGITATION POSITION		4			On	~5-15
MOTOR AGITATES		4		1	On	10
If motor does not agitate, go to Manual Overview Test: Gentle or Heavy Agitation, page 9.						
DRAIN PUMP WILL ACTUATE		4	2		On	Till Empty
If water is not draining, go to Manual Overview Test: Drain, page 9.						
SHIFTER MOVES TO SPIN POSITION		4	2	1	On	~5-15
MOTOR SPINS	8				On	10
If basket is not turning, go to Manual Overview Test: Low or High Spin, page 9.						
LID REMAINS LOCKED UNTIL WASHER SENSES A STOPPED BASKET	8			1	On	~30-45
Basket must stop spinning (0 RPM) before test continues to next phase. Time for basket to stop spinning may vary from 30 seconds up to 2 minutes.						
LID WILL UNLOCK AND CYCLE COMPLETES	8		2			1
If lid does not unlock, go to Manual Overview Test: Lid Lock, page 9.						~3 min

MANUAL OVERVIEW TEST MODE — See page 4 to access Manual Overview Test Mode. ■ = ON

Pressing the **START** button will activate/deactivate each output. When the output is activated, the corresponding Status LEDs will flash. **IMPORTANT:** Lid must be closed and locked to perform **SPIN** & **AGITATE** tests.

OUTPUT	STATUS LEDs				
Output Details **NOTE:** Outputs will time-out after 5 minutes.	SOAK/ WASH	RINSE	FINAL SPIN	DONE	LID LOCKED
LID LOCK					
Lock and unlock the lid. **NOTES:** When lock is enabled, the "Lid Locked" LED will turn ON. Will only lock when lid is closed. Will only unlock when basket RPM is 0. If lid is not closed, washer will flash status LEDs on and off. • If lid does not lock or unlock, go to TEST #8: Lid Lock, page 18.					
COLD VALVE				1	
Turns ON and turns OFF cold water valve. • If valve does not turn on, go to TEST #2: Valves, page 13.					
HOT VALVE			2		
Turns ON and turns OFF hot water valve. • If valve does not turn on, go to TEST #2: Valves, page 13.					
UNUSED			2	1	
UNUSED		4			
UNUSED		4		1	
UNUSED		4	2		
DRAIN		4	2	1	
Turns ON and turns OFF the drain pump. • If pump does not turn on, go to TEST #7: Drain Pump, page 17.					
UNUSED	8				
LOW SPIN – To perform test, lid must be closed and locked.	8			1	On
Spins basket from 0 to 500 RPM. **NOTE:** Allow up to 15 seconds for shifter to reposition. **IMPORTANT:** To activate Low Spin, RPM must read "0" and lid must be closed with lid lock enabled. If lid is not closed, status LEDs will flash on and off. **IMPORTANT:** Water in tub must be drained before test. • If motor does not spin, go to TEST #3a & 3b: Drive System (Shifter & Motor), pages 13 & 14.					
HIGH SPIN – To perform test, lid must be closed and locked.	8		2		On
Spins basket from 0 to maximum RPM. **NOTE:** Allow up to 15 seconds for shifter to reposition. **IMPORTANT:** To activate High Spin, RPM must read "0" and lid must be closed with lid lock enabled. If lid is not closed, status LEDs will flash on and off. **IMPORTANT:** Water in tub must be drained before test. • If motor does not spin, go to TEST #3a & 3b: Drive System (Shifter & Motor), pages 13 & 14.					
GENTLE AGITATION – To perform test, lid must be closed and locked.	8		2	1	On
Shifts from idle motor to gentle CW/CCW agitation. **NOTE:** Allow up to 15 seconds for shifter to reposition. **IMPORTANT:** To activate Gentle Agitation, RPM must read "0" and lid must be closed with lid lock enabled. If lid is not closed, status LEDs will flash on and off. • If motor does not agitate, go to TEST #3a & 3b: Drive System (Shifter & Motor), pages 13 & 14.					
HEAVY AGITATION – To perform test, lid must be closed and locked.	8	4			On
Shifts from idle motor to heavy CW/CCW agitation. **NOTE:** Allow up to 15 seconds for shifter to reposition. **IMPORTANT:** To activate Heavy Agitation, RPM must read "0" and lid must be closed with lid lock enabled. If lid is not closed, status LEDs will flash on and off. • If motor does not agitate, go to TEST #3a & 3b: Drive System (Shifter & Motor), pages 13 & 14.					

TROUBLESHOOTING GUIDE **NOTE:** Always check for error codes first (pgs. 6–7).

Some tests will require accessing components. See Figures 7 & 8, page 19, for component locations. For detailed troubleshooting procedures, refer to "Troubleshooting Tests" beginning on page 12.

PROBLEM	POSSIBLE CAUSE	CHECKS & TESTS
WON'T POWER UP • No operation • No Status LEDs	No power to washer.	Check power at outlet, check circuit breakers, fuses, or junction box connections.
	Connection problem between AC plug and main control.	Check the AC power cord for continuity.
	Main control not properly installed in console.	See TEST #4: Console and Indicators, page 16.
	Main control problem.	See TEST #1: Main Control, page 12.
WON'T START CYCLE No response when Start Button is pressed.	Lid lock mechanism not functioning.	1. Lid not closed due to interference. 2. Lock not closed due to interference. 3. See TEST #8: Lid Lock, page 18.
	User Interface problem.	See TEST #4: Console and Indicators, page 16.
	Main control problem.	See TEST #1: Main Control, page 12.
UI WON'T ACCEPT SELECTIONS	User Interface problem.	See TEST #4: Console and Indicators, page 16.
	Main control problem.	See TEST #1: Main Control, page 12.
WON'T FILL	No water supplied to washer.	1. Check water connections to washer. 2. Verify hot and cold water supply is on.
	Plugged filter/screen.	Check for plugged filter or screen in the water valve or hoses.
	Drain hose installation.	Check for proper drain hose installation.
	Valve problem.	See TEST #2: Valves, page 13.
	Main control problem.	See TEST #1: Main Control, page 12.
OVERFILLS	Pressure hose.	See TEST #6: Water Level, page 17.
	Valve problem.	See TEST #2: Valves, page 13.
	Washer requires calibration.	Perform washer calibration on page 4.
	Onboard pressure transducer.	See TEST #6: Water Level, page 17.
	Main control problem.	See TEST #1: Main Control, page 12.
WON'T AGITATE	Water covering impeller?	See TEST #6: Water Level, page 17.
	Is lid lock showing open during the cycle?	See TEST #8: Lid Lock, page 18.
	Drive belt.	Verify that drive belt is not damaged.
	Harness connections.	Check harness connections between main control and drive system.
	Shifter problem.	See TEST #3a: Drive System – Shifter, page 13.
	Motor or motor relay problem.	See TEST #3b: Drive System – Motor, page 14.
	Tachometer problem.	No tub movement or tub speed out of normal range (obstruction/belt/motor).
	Main control problem.	See TEST #1: Main Control, page 12.
WON'T SPIN	Is lid lock showing open during the cycle?	See TEST #8: Lid Lock, page 18.
	Drive belt.	Verify that drive belt is not damaged.
	Harness connections.	Check harness connections between main control and drive system.
	Shifter problem.	See TEST #3a: Drive System – Shifter, page 13.
	Motor or motor relay problem.	See TEST #3b: Drive System – Motor, page 14.
	Tachometer problem.	No tub movement or tub speed out of normal range (obstruction/belt/motor).
	Main control problem.	See TEST #1: Main Control, page 12.

DO NOT REMOVE OR DESTROY

TROUBLESHOOTING GUIDE (cont.)

Some tests will require accessing components. See Figures 7 & 8, page 19, for component locations. For detailed troubleshooting procedures, refer to "Troubleshooting Tests" beginning on page 12.

PROBLEM	POSSIBLE CAUSE	CHECKS & TESTS
INCORRECT WATER TEMPERATURE	Water hose installation.	Make sure inlet hoses are connected properly.
	Temperature thermistor.	See TEST #5: Temperature Thermistor, page 16.
	Valve problem.	See TEST #2: Valves, page 13.
	Main control problem.	See TEST #1: Main Control, page 12.
WON'T DRAIN	Drain hose installation.	Check for proper drain hose installation. Make sure it is not inserted more than 4.5" (114 mm).
	Plugged drain hose.	Check drain hose for obstructions.
	Obstructions to drain pump.	Check tub sump under agitator plate & basket for obstructions.
	Harness connections.	Check harness connections between main control and drain pump.
	Drain pump.	See TEST #7: Drain Pump, page 17.
	Main control problem.	See TEST #1: Main Control, page 12.
CYCLE TIME LONGER THAN EXPECTED	Oversuds.	1. Verify use of HE detergent. 2. Excessive detergent usage.
	Off balance.	1. Load is off balance. 2. Balance ring water leak.
	Draining slowly.	Check for pump or drain hose obstructions.
	Water pressure drop.	Results in longer fill time.
	Friction or drag on drive.	Check motor and bearings; check for clothes between tub and basket.
	Weak suspension.	Basket should not bounce up and down more than once when pushed.
POOR WASH PERFORMANCE	Oversuds.	1. Verify use of HE detergent. 2. Excessive detergent usage.
	Load is tangling.	1. Washer not loaded properly. 2. Perform washer calibration on page 4.
	Incorrect water level.	1. Perform washer calibration on page 4. 2. See TEST #2: Valves, page 13. 3. See TEST #6: Water Level, page 17.
	Clothes wet after cycle is complete (not water saturated, but very damp).	1. Overloaded washer. 2. Oversuds (see above). 3. Items caught in tub sump. 4. Weak suspension. 5. Shifter not moving into position (see TEST #3a, page 13). 6. Cold/Rinse water > 105°F (41°C). 7. See TEST #7: Drain Pump, page 17.
	Load not rinsed.	1. Check proper water supply. 2. Not using HE detergent. 3. Washer not loaded properly. 4. Shifter not moving into position (see TEST #3a, page 13). 5. See TEST #2: Valves, page 13.
	Not cleaning clothes.	1. Washer not loaded properly. 2. Not using HE detergent. 3. Not using correct cycle. 4. Shifter not moving into position (see TEST #3a, page 13).
	Fabric damage.	1. Washer overloaded. 2. Bleach added incorrectly. 3. Sharp items in tub.
	Wrong option or cycle selection.	Select option or cycle appropriate for the load.

TROUBLESHOOTING TESTS

TEST #1: Main Control

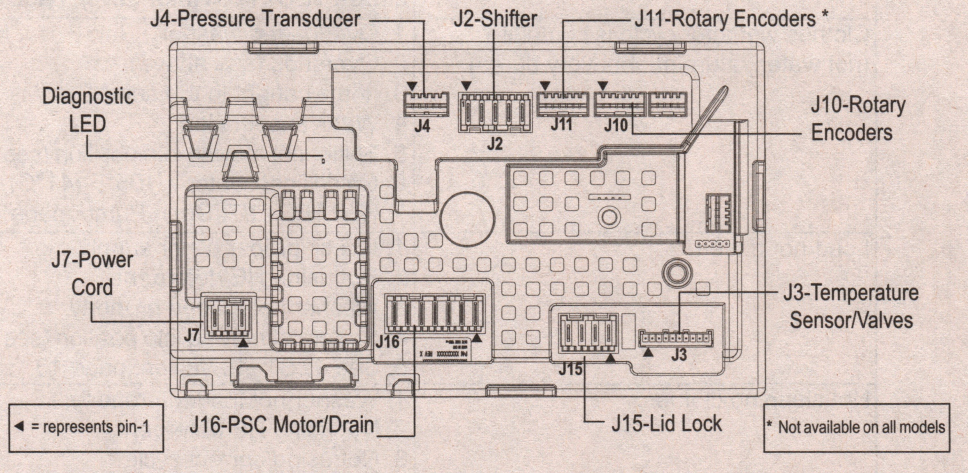
This test checks for incoming and outgoing supplies to and from the main control. This test assumes that proper voltage is present at the outlet.

1. Unplug washer or disconnect power.
2. Remove console to access main control.
3. Verify that ALL connectors are inserted all the way into the main control.
4. Plug in washer or reconnect power.
5. With a voltmeter set to **AC**, connect black probe to J7-3 (Neutral) and red probe to J7-1 (L1).
   - ➢ If 120VAC is present, go to step 6.
   - ➢ If 120VAC is not present, check the AC power cord for continuity (See Figure 9).
6. Is the "Diagnostic LED" ON or OFF? (See Figure 3 below for LED location.)
   - ➢ ON: (+5VDC present) continue to step 7.
   - ➢ OFF: (+5VDC missing) proceed to step 8.
7. With a voltmeter set to **DC**, connect black probe to J2-3 (Circuit Gnd) and red probe to J2-4 (+13VDC).
   - ➢ If +13VDC is present, main control supplies are good.
   - ➢ If +13VDC is not present, go to step 8.

Main Control Board Connectors & Pinouts (Figure 3)

SHIFTER	J2	J2-5		OPEN
		J2-4	BLK	+13VDC
		J2-3	GRY	-5VDC (CIRCUIT GND)
		J2-2	PNK	RPM INPUT
		J2-1	BLU	SHIFTER POSITION INPUT
TEMP	J3	J3-10	BLK	TEMP THERMISTOR INPUT (HYBRID)
		J3-9	BLK	TEMP THERMISTOR GND (HYBRID)
VALVES		J3-8		OPEN
		J3-7		OPEN
		J3-6		OPEN
		J3-5	BLU	COLD VALVE (L1)
		J3-4	RED	HOT VALVE (L1)
		J3-3		OPEN
		J3-2		OPEN
		J3-1	WHT	NEUTRAL
PRESSURE TRANSDUCER	J4	J4-3	BLU	PRESSURE TRANSDUCER INPUT
		J4-2		OPEN
		J4-1	BLU	-5VDC (CIRCUIT GND)
POWER CORD	J7	J7-3	BLK	NEUTRAL
		J7-2	GRN	CHASSIS GROUND
		J7-1	BLK	L1

ROTARY ENCODERS	J10	J10-6	BLK	ROW 2
		J10-5	BLK	ROW 3
		J10-4	BLK	COLUMN 0
		J10-3	BLK	COLUMN 1
		J10-2	BLK	COLUMN 2
		J10-1	BLK	COLUMN 3
ROTARY ENCODERS	J11	J11-6	RED	ROW 4
		J11-5	RED	ROW 5
		J11-4	RED	COLUMN 0
		J11-3	RED	COLUMN 1
		J11-2	RED	COLUMN 2
		J11-1	RED	COLUMN 3
LID LOCK	J15	J15-4	RED	LOCK SWITCH
		J15-3	WHT	NEUTRAL
		J15-2	BLU	LID SWITCH INPUT
		J15-1	YEL	LOCK SWITCH SOLENOID (L1)
MOTOR	J16	J16-7	ORN	MOTOR CCW WINDING (L1)
		J16-6	RED	MOTOR CW WINDING (L1)
		J16-5		OPEN
		J16-4	WHT	MOTOR (NEUTRAL)
DRAIN		J16-3	LT BLU	DRAIN PUMP MOTOR (L1)
		J16-2	W/ BLU	SHIFTER MOTOR (NEUTRAL)
		J16-1	BRN	SHIFTER MOTOR (L1)



8. Check if shifter assembly is affecting the main control DC supplies.
a. Unplug washer or disconnect power.
b. Remove connector **J2** from main control.
c. Plug in washer or reconnect power.
d. Repeat steps 6 and 7. Perform the +13VDC check inside header J2 on the board – **do not short pins together**.

➢ If one or more DC voltages are still missing, go to step 9.

➢ If the DC voltages return, check for short in harness between main control and shifter assy.

➢ If harness and connections are good, replace shifter assembly.

9. Main Control has malfunctioned.
a. Unplug washer or disconnect power.
b. Replace the main control.
c. Reassemble all parts and panels.
d. Plug in washer or reconnect power. Calibrate washer and perform Quick Overview Test to verify repair.

TEST #2: Valves

This test checks the electrical connections to the valves and the valves themselves.

1. Check the relays and electrical connections to the valves by performing the Cold and Hot Valve tests under Manual Overview Test Mode on page 9. Each test activates and deactivates the selected valve. The following steps assume one (or more) valve(s) did not turn on.
2. For the valve(s) in question, check the individual solenoid valves:
a. Unplug washer or disconnect power.
b. Remove console to access main control.
c. Remove connector **J3** from main control. Refer to main control diagram on page 12.
d. Check harness connection to solenoid valves.
3. Check resistance of the valve coils across the following J3 connector pinouts:

Valve	Pinout
Hot Valve	J3, 1 & 4
Cold Valve	J3, 1 & 5

Resistance should be 890–1.3k Ω.

➢ If resistance readings are tens of ohms outside of range, replace the valve assembly.

➢ If resistance readings are within range, replace main control and calibrate washer. Perform Quick Overview Test to verify repair.

TEST #3a: Drive System – Shifter

This test checks connections, shifter motor, switch, and optical sensor.

NOTE: Refer to Figure 4, "Shifter Assembly Strip Circuit" on page 14 for tests and measurements.

IMPORTANT: Drain water from tub before accessing bottom of washer.

Functional Check:

1. Check the shifter and electrical connections by performing both the Spin AND Agitate test under Manual Overview Test Mode on page 9. The following steps assume that this step was unsuccessful.
2. Unplug washer or disconnect power.
3. Check to see if basket will turn freely.

➢ If basket turns freely, go to step 4.

➢ If basket does not turn freely, determine what is causing the mechanical friction or lockup.

4. Remove console to access main control.
5. Visually check that the J2 and J16 connectors are inserted all the way into the main control.

➢ If visual checks pass, go to step 6.

➢ If connectors are not inserted properly, reconnect J2 and J16 and repeat step 1.

Shifter Motor:

6. Remove connector **J16** from main control. With an ohmmeter, verify resistance of the shifter motor across the following J16 connector pinouts:

Component	J16 Connector Pinout
Shifter Motor	J16, 1 & 2

Resistance should be 2k to 3.5k Ω.

➢ If values are correct, reconnect J16 and proceed to step 7.

➢ If values are open or out of range, go to step 13.

7. Plug in washer or reconnect power.
8. With a voltmeter set to **AC**, connect the black probe to J16-2 (N) and red probe to J16-1 (L1). Activate shifter motor by switching between Spin and Agitate modes. Energize outputs using Manual Overview Test Mode on page 9.

IMPORTANT: Lid must be closed with Lid Lock enabled to run the SPIN and AGITATE tests.

NOTE: It will take 4–15 seconds for the shifter to change states.

➢ If 120VAC is present, go to step 9.

➢ If 120VAC is not present, go to step 17.

Shifter Switch:

9. With a voltmeter set to **DC**, connect the black probe to J2-3 (Circuit Gnd) and red probe to J2-1 (Shifter Switch). In manual test mode, switch between Spin and Agitate modes. Voltage should toggle between 0 and +5VDC.

SPIN = +5 VDC

AGITATE = 0 VDC

- ➢ If voltage corresponds to setting, go to step 10.
- ➢ If voltage does not switch, go to step 12.

Optical Sensor:

10. With a voltmeter set to **DC**, connect the black probe to J2-3 (Circuit Gnd) and red probe to J2-4 (+13VDC).

- ➢ If +13VDC is present, go to step 11.
- ➢ If +13VDC is not present, go to step 17.

11. Activate Tachometer Verification Mode from the Service Diagnostic Test Modes (see page 5). Slowly turn the basket by hand. The 4 status LEDs should illuminate one at a time to represent basket RPM.

- ➢ If the tachometer is not verified, go to step 12.
- ➢ If the tachometer is verified, go to step 17.

12. Unplug washer or disconnect power.

13. Tilt washer back to access the bottom of the washer and the drive motor area.

14. Visually check the electrical connections to the shifter.

- ➢ If visual check passes, go to step 15.
- ➢ If connections are loose, reconnect the electrical connections and repeat step 1.

15. With an ohmmeter, check the harness for continuity between the shifter and main control using the pinouts in the following chart.

- ➢ If there is continuity, go to step 16.
- ➢ If there is no continuity, replace the lower washer harness and repeat step 1.

Shifter to Main Control & Drain Pump
Shifter Connector Pin 2 to Main Control J16-2
Shifter Connector Pin 3 to Main Control J16-1
Shifter Connector Pin 4 to Main Control J2-4
Shifter Connector Pin 5 to Main Control J2-3
Shifter Connector Pin 6 to Main Control J2-2
Shifter Connector Pin 7 to Main Control J2-1

16. Replace the shifter assembly.

a. Unplug washer or disconnect power.

b. Replace shifter assembly.

c. Reassemble all parts and panels.

d. Plug in washer or reconnect power. Calibrate washer and perform Quick Overview Test to verify repair.

17. If the preceding steps did not correct the problem, replace the main control.

a. Unplug washer or disconnect power.

b. Replace the main control.

c. Reassemble all parts and panels.

d. Plug in washer or reconnect power. Calibrate washer and perform Quick Overview Test to verify repair.

TEST #3b: Drive System – Motor

This test checks the motor, motor relay, motor windings, wiring, and start capacitor.

NOTE: Refer to Figure 5, "Drive Motor Strip Circuit" on page 15 for tests and measurements.

IMPORTANT: Drain water from tub before accessing bottom of washer.

1. Check the motor and electrical connections by performing the Gentle or Heavy Agitation test under Manual Overview Test Mode on page 9. The following steps assume that this step was unsuccessful.

2. Unplug washer or disconnect power.

3. Check to see if basket will turn freely.

- ➢ If basket turns freely, go to step 4.
- ➢ If basket does not turn freely, determine what is causing the mechanical friction or lockup.

4. Remove console to access main control.

5. Visually check that the J2 and J16 connectors are inserted all the way into the main control.

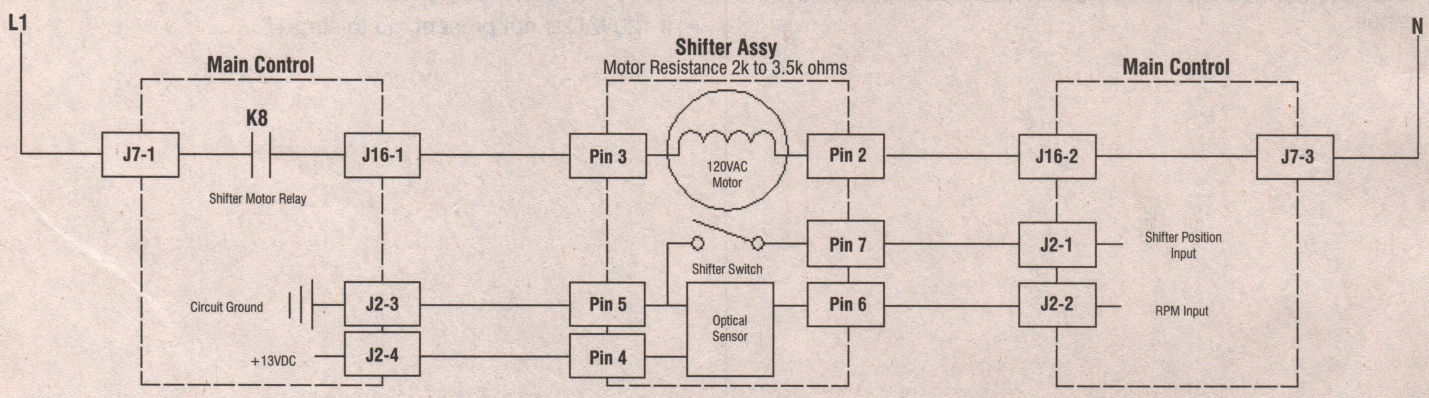


Figure 4 - Shifter Assembly Strip Circuit (Shifter Switch: Open = SPIN, Closed = AGITATE)

- If visual checks pass, go to step 6.
- If connectors are not inserted properly, reconnect J2 and J16 and repeat step 1.

6. Plug in washer or reconnect power. Run the Gentle Agitation test under Manual Overview Test Mode on page 9.

7. With a voltmeter set to **AC**, connect black probe to motor relay pin 2 and red probe to J16-6 (CCW Winding).

- If 120VAC is cycling ON during CCW rotation, go to step 8.
- If 120VAC is not present, go to Test #1: Main Control, page 12.

8. With a voltmeter set to **AC**, connect black probe to motor relay pin 2, red probe to J16-7 (CW Winding).

- If 120VAC is cycling ON during CW rotation, go to step 9.
- If 120VAC is not present, go to Test #1: Main Control, page 12.

9. Unplug washer or disconnect power.

10. Remove connector **J16** from main control. With an ohmmeter, check resistance of motor windings across the following J16 connector pinouts:

NOTE: If the console has a cycle selector knob and **4** rotary switches, the motor size is 1/2 HP.

Size	Motor Winding	J16 Pinout	Resistance
1/2 HP	CCW Winding	J16-6 to motor relay pin 2	3.5 to 6 Ω
	CW Winding	J16-7 to motor relay pin 2	3.5 to 6 Ω

- If values are open or out of range, go to step 11.
- If values are correct, go to step 15.

11. Tilt washer back to access drive system.

12. Visually check the mounting bracket and electrical connections to the motor and shifter.

- If visual check passes, go to step 13.
- If connections are loose, reconnect the electrical connections, reassemble motor cover, and repeat step 1.

13. With an ohmmeter, check the harness for continuity between the main control, motor, and run capacitor using the following test points.

Motor Harness Check
Motor Connector Pin 1 to Chassis Ground
Motor Connector Pin 3 to Main Control J16-7 Motor Connector Pin 3 to Run Capacitor Pin 3
Motor Connector Pin 4 to Main Control J16-6 Motor Connector Pin 4 to Run Capacitor Pin 1
Motor Connector Pin 2 to Motor Relay Pin 2

- If there is continuity, go to step 14.
- If there is no continuity, replace the lower machine harness and repeat step 1.

14. With an ohmmeter, check resistance of motor windings at the following motor connections.

NOTE: If the console has a cycle selector knob and **4** rotary switches, the motor size is 1/2 HP.

Size	Motor Winding	Motor Pinout	Resistance
1/2 HP	CCW Winding	Pins 4 & 2	3.5 to 6 Ω
	CW Winding	Pins 3 & 2	3.5 to 6 Ω

- If values are open or out of range, replace motor.
- If values are correct, go to step 15.

15. Test Motor Run Capacitor. **NOTE:** A faulty capacitor may cause the motor to "hum", not start, or turn slowly.

a. Discharge the capacitor by touching the leads of a 20,000 Ω resistor to the two terminals.

b. Disconnect the wires from the capacitor terminals.

c. With an ohmmeter, measure across the terminals and note reading.

- If a steady increase in resistance is noted, continue to step 16.

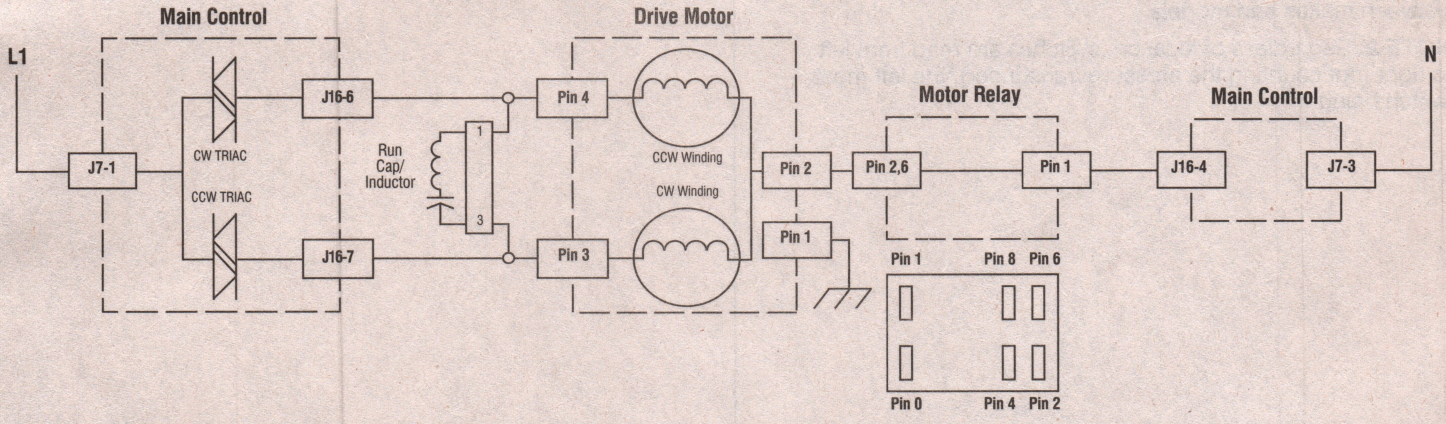


Figure 5 - Drive Motor Strip Circuit (shown in ON position)

➢ If the capacitor is either shorted or open, replace capacitor, calibrate the washer, and repeat step 1.

16. If the preceding steps did not correct the motor problem, replace the main control.

a. Unplug washer or disconnect power.

b. Replace the main control.

c. Reassemble all parts and panels.

d. Plug in washer or reconnect power. Calibrate washer and perform Quick Overview Test on page 8 to verify repair.

TEST #4: Console and Indicators

Console and Indicators Check:

This test is performed when any of the following situations occurs during "UI Test Mode" on page 4.

✓ None of the LEDs light up

✓ One or more Status LEDs are flashing

✓ Turning rotary switch does not toggle LED

None of the LEDs light up:

1. Unplug washer or disconnect power.

2. Access the main control and visually check that ALL connectors are inserted all the way into their respective headers.

3. Visually check that the main control assembly is properly inserted in the console.

4. If both visual checks pass, follow procedure under TEST #1, "Main Control" on page 12 to verify supply voltages.

5. To verify repair, activate the Service Diagnostic Mode, and then perform UI Test Mode on page 4.

One or more Status LEDs are flashing:

If one or more of the status LEDs are flashing (on and off in 0.5 second intervals), refer to the following notes to identify the switch(es) in question. Reference the wiring diagram on page 20 when performing the following procedures.

a. Verify the switch connector is inserted all the way into the main control.

b. Check the harness between the switch and main control for continuity. Check for shorts.

c. Replace the switch.

d. Replace the main control.

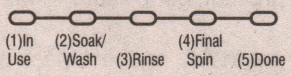
NOTE 1: The number and location of rotary switches varies between makes and models.

NOTE 2: Regardless of location, switches are read from left to right (not counting the pressure transducer), the left-most switch being #1.

NOTE 3: Each rotary switch and the cycle selector knob is represented by the following status LEDs:

- Rotary Switch #1 – toggles (1) In Use LED
- Rotary Switch #2 – toggles (2) Soak/Wash LED
- Rotary Switch #3 – toggles (3) Rinse LED
- Rotary Switch #4 – toggles (4) Final Spin LED
- Cycle Select Knob – toggles (5) Done LED

NOTE 4: Status LED names may vary between makes and models. Use LED # identification.



Turning rotary switch does not toggle LED:

Perform the procedures under "One or more Status LEDs are flashing."

TEST #5: Temperature Thermistor

This test checks valves, main control, temperature thermistor, and wiring.

1. Check the cold valve by performing Cold Valve test under Manual Overview Test Mode on page 9.

➢ If cold water is being dispensed, proceed to step 2.

➢ If hot water is being dispensed, verify proper hose connection.

2. Check the hot valve by performing Hot Valve test under Manual Overview Test Mode on page 9.

➢ If hot water is being dispensed, proceed to step 3.

➢ If cold water is being dispensed, ensure that household hot water is present.

3. Unplug washer or disconnect power.

4. Remove console to access main control.

5. Remove connector **J3** from the main control. With an ohmmeter, measure the resistance of the temperature thermistor between pins J3-9 and J3-10. Verify that the approximate resistance, shown in the following table, is within ambient temperature range.

THERMISTOR RESISTANCE		
Approx. Temperature		Approx. Resistance
F°	C°	(KΩ)
32	0	163
41	5	127
50	10	100
59	15	79
68	20	62
77	25	50
86	30	40
95	35	33
104	40	27
113	45	22
122	50	18
131	55	15
140	60	12
149	65	10

- If the resistance is within the range shown in the table, go to step 6.
- If the resistance is infinite or close to zero, replace the temperature thermistor assembly.

NOTE: Most thermistor errors are a result of the resistor being out of range. If the temperature thermistor malfunctions, the washer will default to pre-programmed wash settings.

6. If the thermistor is good, replace main control and calibrate washer. Perform Quick Overview Test to verify repair.

TEST #6: Water Level

This test checks the water level sensing components. This washer uses an on-board pressure transducer. **NOTE:** Usually, if the pressure transducer malfunctions, the washer will generate a long fill or long drain error.

1. Check the functionality of the pressure transducer by running a small load cycle. The valves should turn off automatically after sensing the correct water level in the tub. The following steps assume that this step was unsuccessful.
2. Drain the tub until all water has been removed.
3. Unplug washer or disconnect power.
4. Remove console to access controls.
5. Check hose connection between the pressure transducer and the pressure dome attached to the tub.
6. Check to ensure hose is routed correctly in the lower cabinet and not pinched or crimped by the back panel.
7. Verify there is no water, suds, or debris in the hose or dome. Disconnect hose from main control and blow into hose to clear water, suds, or debris.
8. Check hose for leaks. Replace if needed.
9. If the preceding steps did not correct the problem, replace the main control and calibrate washer. Perform Quick Overview Test to verify repair.

TEST #7: Drain Pump

Perform the following checks if washer does not drain.

NOTE: Refer to Figure 6, "Drain Pump Strip Circuit" for tests and measurements.

IMPORTANT: Drain water from tub before accessing bottom of washer.

1. Check for obstructions in the usual areas. Clean and then perform step 2.

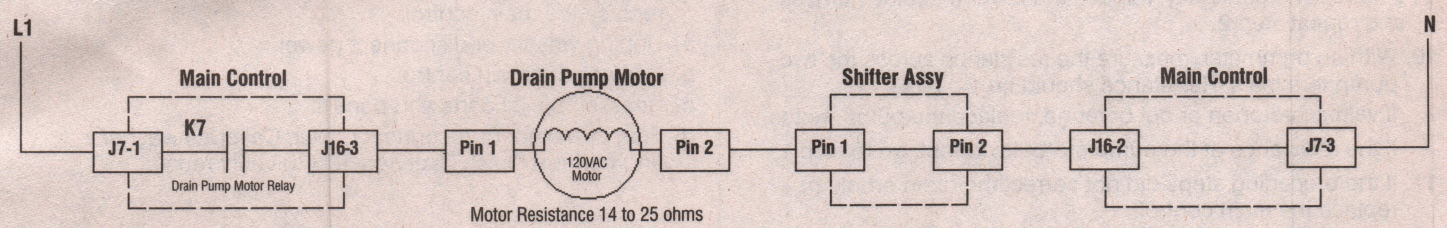


Figure 6 - Drain Pump Strip Circuit

2. Check the drain pump and electrical connections by performing the Drain Test under Manual Overview Test Mode on page 9. The following steps assume that this step was unsuccessful.
3. Unplug washer or disconnect power.
4. Remove console to access main control.
5. Visually check that the J16 connector is inserted all the way into the main control.

➢ If visual check passes, go to step 6.

➢ If connector is not inserted properly, reconnect J16 and repeat step 2.

6. Remove connector **J16** from main control. With an ohmmeter, verify resistance values shown below across the following J16 connector pinouts:

Component	J16 Connector Pinout
Drain Pump	J16, 2 & 3

Resistance should be 14–25 Ω.

➢ If values are open or out of range, go to step 7.

➢ If values are correct, go to step 11.

7. Tilt washer back to access drain pump. Verify pump is free from obstructions.
8. Visually check the electrical connections at the drain pump.

➢ If visual check passes, go to step 9.

➢ If connections are loose, reconnect the electrical connections and repeat step 2.

9. With an ohmmeter, check harness for continuity between the drain pump and main control. See chart below.

Main Control to Drain Pump
Drain Pump Pin 1 to Main Control J16-3
Drain Pump Pin 2 to Main Control J16-2

➢ If there is continuity, go to step 10.

➢ If there is no continuity, replace the lower machine harness and repeat step 2.

10. With an ohmmeter, measure the resistance across the two pump terminals. Resistance should be 14–25 Ω.

➢ If values are open or out of range, replace the pump motor.

➢ If the resistance at the pump motor is correct, go to step 11.

11. If the preceding steps did not correct the drain problem, replace the main control.

a. Unplug washer or disconnect power.
b. Replace the main control.
c. Reassemble all parts and panels.
d. Plug in washer or reconnect power. Calibrate washer and perform Quick Overview Test to verify repair.

TEST #8: Lid Lock

Perform the following checks if the washer does not lock (or unlock).

1. Perform the Lid Lock test under Manual Overview Test Mode on page 9. The following steps assume that this step was unsuccessful.
2. Check lid lock mechanism for obstruction or binding. Repair as necessary.
3. Unplug washer or disconnect power.
4. Remove console to access main control.
5. Visually check that the J15 connector is inserted all the way into the main control.

➢ If visual check passes, go to step 6.

➢ If connector is not inserted properly, reconnect J15 and repeat step 1.

6. Remove connector **J15** from main control. With an ohmmeter, verify lid lock resistance values shown below across the following J15 connector pinouts:

LID LOCK RESISTANCE			
Component	Resistance	Contacts Measured	
Lock Switch Solenoid	85 to 155 ohms	J15-1	J15-3
Lock Switch	Locked = 0 ohms Unlocked = Open Circuit	J15-3	J15-4
Lid Switch	Lid Closed = 0 ohms Lid Open = Open Circuit	J15-3	J15-2

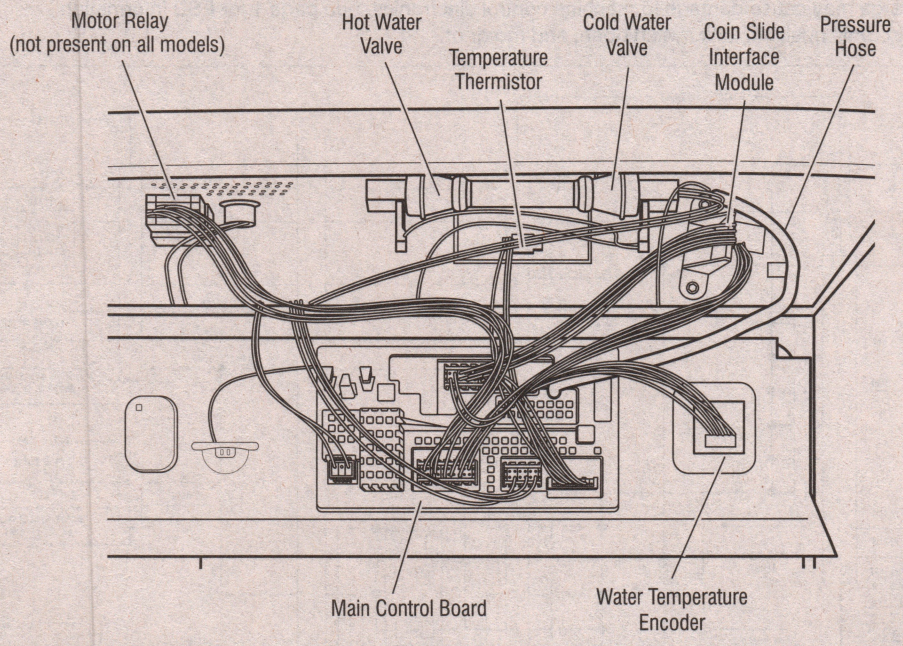
➢ If resistance values are good, go to step 7.

➢ If switch measurements do not match the values shown in the table for unlocked (or locked) condition, a problem exists in the lid lock. Replace the lid lock mechanism.

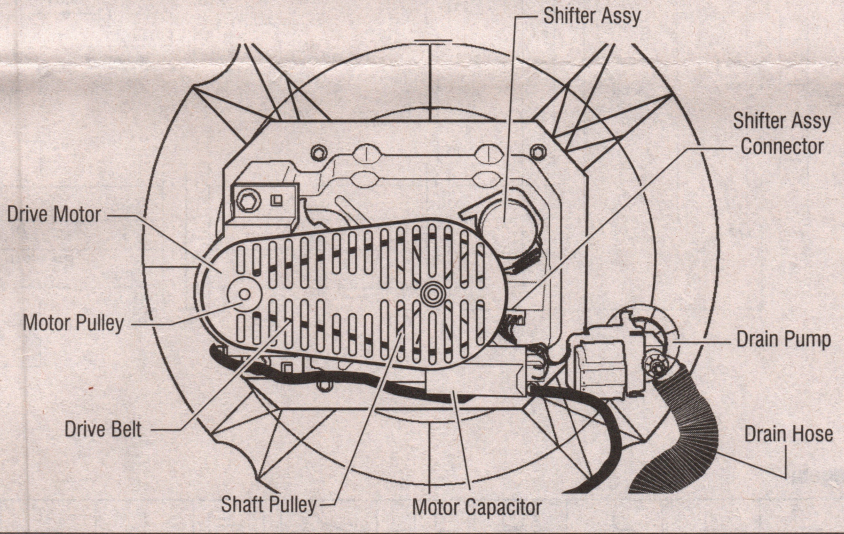
7. If the preceding steps did not correct the lock problem, replace the main control.

a. Unplug washer or disconnect power.
b. Replace the main control.
c. Reassemble all parts and panels.
d. Plug in washer or reconnect power. Calibrate washer and perform Quick Overview Test to verify repair.

Component Locations – Console & Valves (Figure 7)



Component Locations – Drive System & Drain Pump (Figure 8)

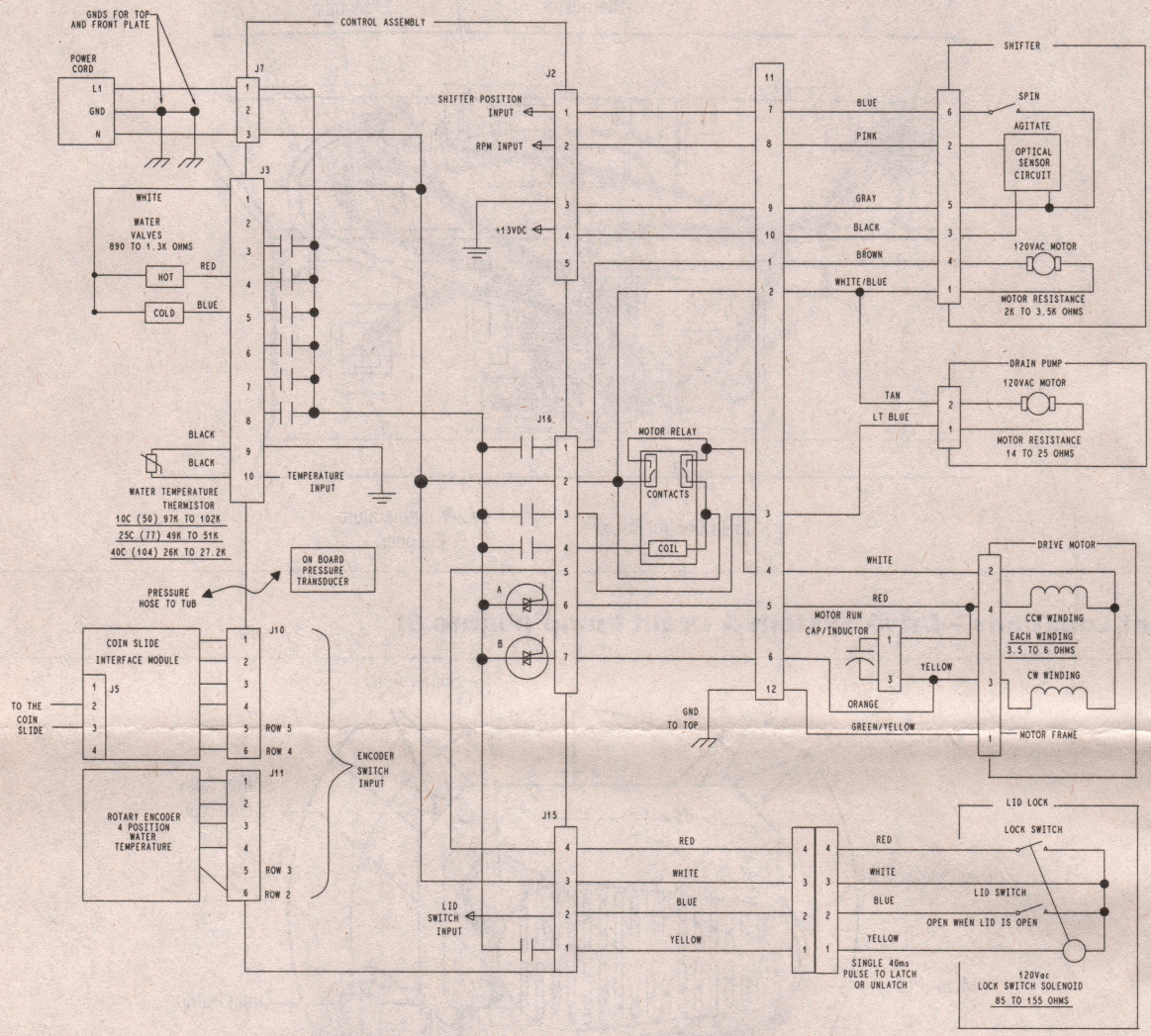


Specifications

WASHER SPECIFICATIONS	
Voltage:	100-135 VAC
Frequency:	57-63 Hz
Max. Amps:	12 Amps
Circuit Protection:	15 Amp Instantaneous Type Fuse (Main Control)
Water Pressure:	15-125 PSI
Drain Height:	34 in. to 8 ft. (86 cm to 244 cm)
Operating Temperature Range:	40 - 115° F (4.5 - 46° C)

Wiring Diagram (No payment system) (Figure 9)

IMPORTANT: Electrostatic discharge may cause damage to machine control electronics. See page 1 for ESD information.
NOTE: Schematic shows shifter in SPIN position, lock switch open, and motor off.



Legend

Component Terminals	Connection (Splice)	No Connection	Motor Triac	Relay	Switch	Thermistor	Circuit Ground	Chassis Ground

Whirlpool HOME APPLIANCES

COMMERCIAL AUTOMATIC WASHER

MODELS:

CAE2745FQ0 (White)

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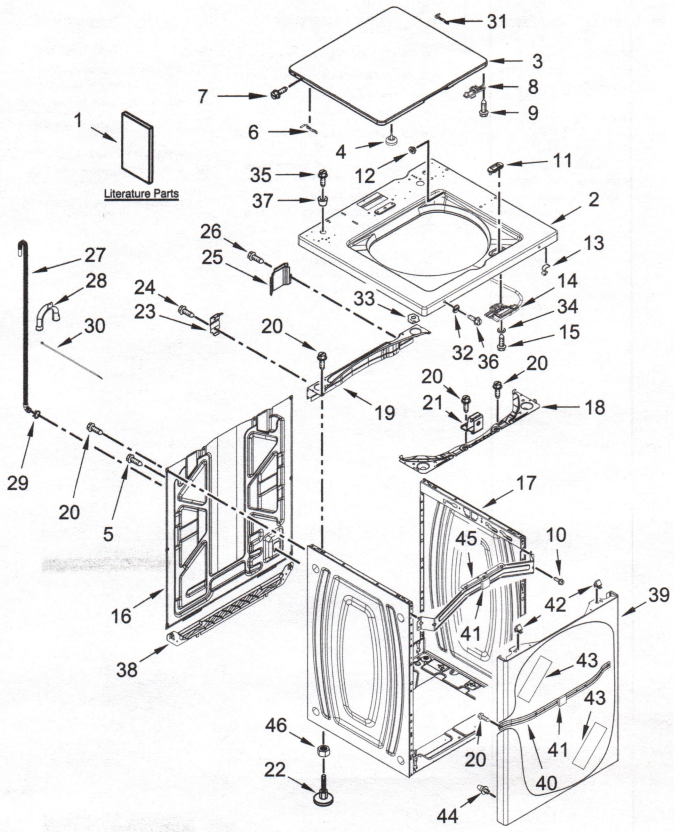
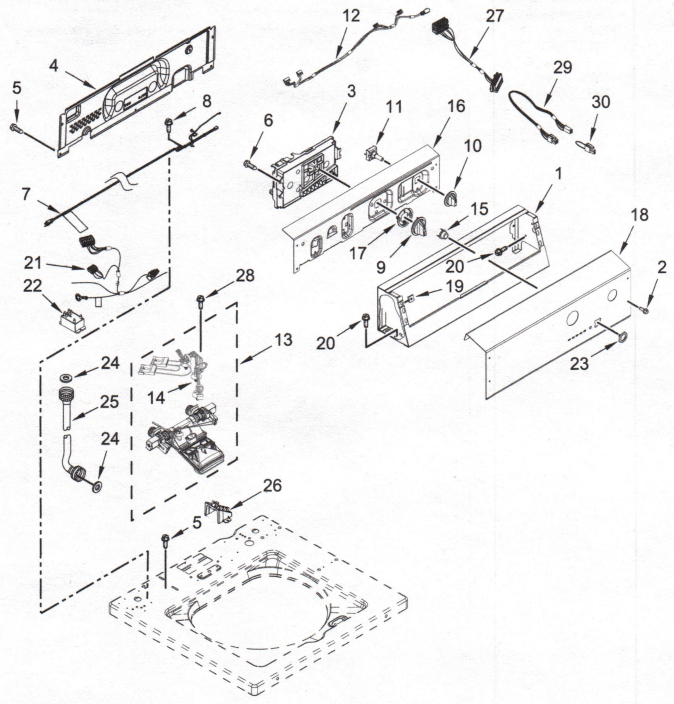
TOP AND CABINET PARTS



TOP AND CABINET PARTS

Illus. No.	Part No.	Description
1		Literature Parts
	W10837923	Use and Care Guide
	W10837712	Installation Instructions
	W10838047	Tech Sheet
	W10837642	Quick Start Guide
	W10860154	Installation Instructions, Coin Kit
2		Top
	W10852766	White
3		Assembly, Lid and Bumper
	W10251302	White
4	W10525268	Bumper, Lid
5	9740848	Screw
6	91770	Hinge, Lid (Left Hand)
7	W10119872	Screw
8		Strike, Lid Lock
	W10240513	White
9	W10273971	Screw
10	W10015090	Screw
11		Bezel, Lid Lock
	W10392041	White
12	21258	Bearing, Lid Hinge
13	90016	Clip, Harness
14	W10482836	Latch, Lid Lock Assembly
15	W10588613	Screw
16	W10250884	Panel, Rear
17		Cabinet
	W10845574	White
18		Brace, Cabinet Top - Front
	W10724131	White
19	W11089573	Brace, Cabinet Top - Rear
20	W10660565	Screw
21	W10461182	Lock, Top
22	W10245373	Foot, Leveling
23	W10461176	Hinge, Top
24	W10142728	Screw
25	W10461180	Cover, Harness
26	3400076	Screw
27	W10221546	Hose, Outer Drain Assembly
28	W10280024	U-Bend, Drain Hose
29	356138	Clamp, Hose
30	W10339879	Tie, Cable
31	54583	Hinge, Lid (Right Hand)
32	W10461181	Bushing-Top, Screw
33	90406	Nut, Cage
34	W10318627	O-Ring
35	3353994	Bolt
36	W10486616	Screw
37	356674	Cone, Wedge
38	W10850379	Bracket, Base
39		Panel, Front
	W10811028	White
40	W10866521	Bracket, Front Panel
41	8283273	Damper, Brace
42	W10862638	Lock, Top Front
43	W10414221	Damper, Sound
44	W10866523	Rivet
45	W10882494	Bracket, Front Top
46	3359452	Nut, Hex

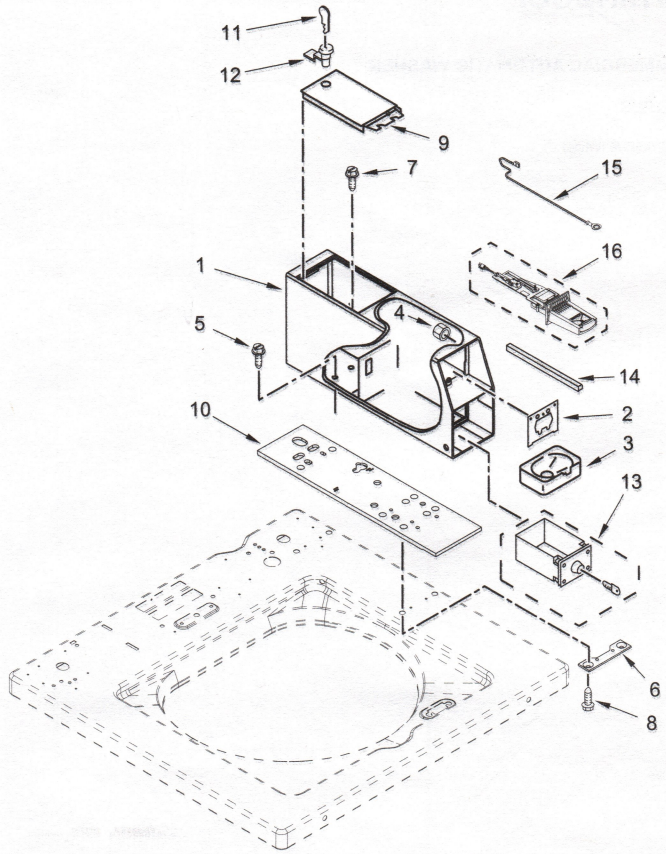
CONTROLS AND WATER INLET PARTS



CONTROLS AND WATER INLET PARTS

Illus. No.	Part No.	Description
1	W10461094	Console
2	W10131119	Screw M4X13
3	W10850396	Control Unit Assembly, Machine & Motor
4	W10461159	Panel, Console Rear Cover
5	W10660565	Screw
6	90767	Screw
7	W10916256	Cord, Power
8	3400076	Screw
9		Assembly, Timer Knob
	W10461101	Gray
10		Knob & Bumper Assembly
	W10461100	Gray
11	W10285518	Switch, Rotary Encoder (5 Position)
12	W10291184	Harness, Upper E-Star
13	W10843663	Inlet Assembly, Water
14	W10843398	Harness, Valve
15	W10461117	Push Button, Start
16	W10461067	Back Bracket, Control Panel
17	W10828902	Insert, Encoder Stop (4 Position)
18	W10829499	Fascia
19	W10131123	Nut, "U"
20	3390631	Screw
21	W10843661	Harness, LED
22	W11032871	Relay
23	W10510149	Bezel - PTS
24	W10242307	Washer, Hose
25		Hose, Water Inlet
	W10852720	Cold Water
	W10852721	Hot Water
26	W10491734	Interface, Coin Slide
27	W10514456	Jumper, Coin Slide Interface
28	W10213953	Screw
29	W10539192	Jumper, Coin Slide Extender
30	W10520398	Jumper, Feature Selection

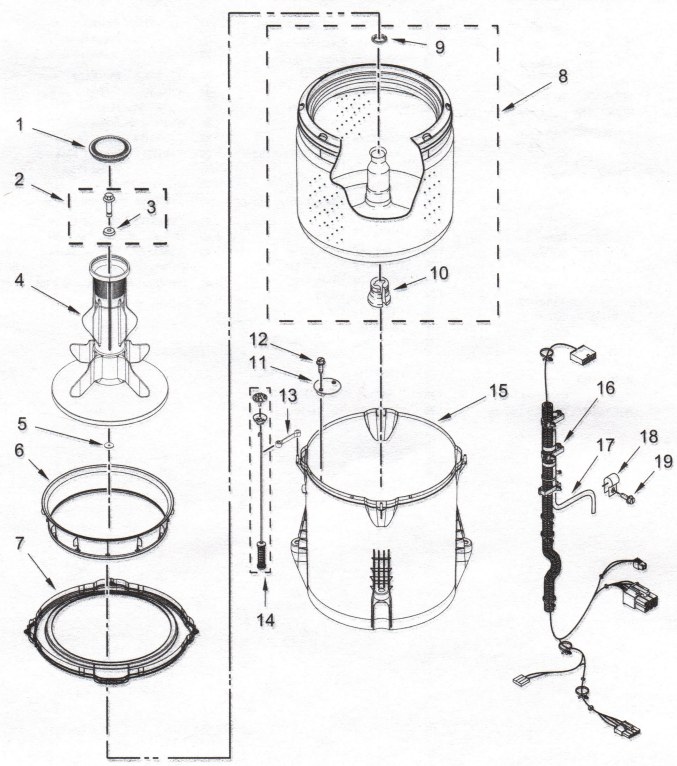
METER CASE PARTS



METER CASE PARTS

Illus. No.	Part No.	Description
1	W10549814	Meter Case
2	3954761	Plate, Adapter
3	385421	Funnel, Coin
4	3400029	Nut
5	3349065	Bolt
6	3347825	Plate, Mounting
7	W10139210	Screw
8	98445	Screw
9	3351136	Assembly, Service Door
10	3954812	Cushion, Meter Case
11	W10114740	777 Lock and Key, Complete
12	8316526	777 Lock and Key, Complete
13	8316525	Money Box W/Lock
14	8318517	Bolt, Slide Mechanism
15	W10623854	Jumper-Ground, Coin Mechanism
16	W10813856	Coin Slide , Vertical 8 (Complete)

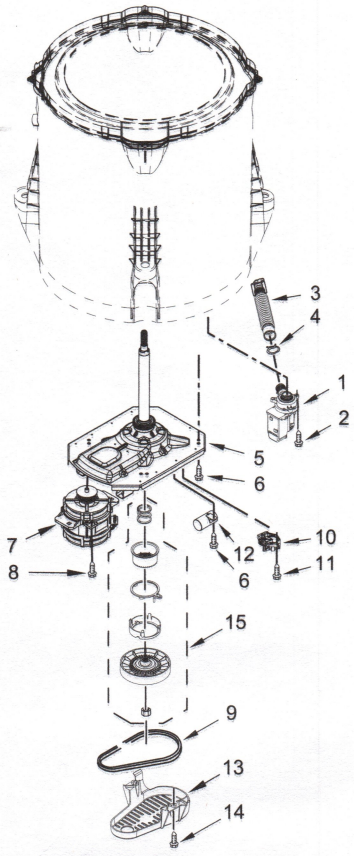
BASKET AND TUB PARTS



BASKET AND TUB PARTS

Illus. No.	Part No.	Description
1	W10131111	Cap, Agitator
2	W10003790	Screw and Washer
3	3949550	Washer
4	W10131112	Agitator
5	W10755559	Rubber Washer, Impeller
6	W10424289	Adapter, Balance Ring
7	W10461196	Ring, Tub
8	W10389330	Basket Assembly
9	21366	Nut, Spanner
10	W10198148	Block, Basket Drive
11	W10215093	Filter, Drain Pump
12	8533928	Screw
13	W10839119	Strap, Snubber
14	W10821942	Damper Assembly, Tub Suspension (Set Of 4-Includes Suspension Balls and Suspension Bushings)
15	W10238320	Tub
16	W10843660	Harness, Lower (Includes Pressure Hose)
17	W10531633	Hose, Pressure Switch
18	W10005430	Clamp, Cable
19	8533943	Screw

GEARCASE, MOTOR AND PUMP PARTS



GEARCASE, MOTOR AND PUMP PARTS

Illus. No.	Part No.	Description
1	W10276397	Pump Assembly, Drain
2	W10004910	Screw
3	W10763078	Hose, Inner Drain Assembly
4	8317496	Clamp, Hose
5	W11092242	Assembly, Gearcase
6	W10249633	Screw
7	W10850134	Motor, Drive
8	W10094780	Screw
9	W10850138	Belt, Drive
10	W10389471	Actuator, Shift
11	9741052	Screw
12	W10625042	Capacitor, Motor Run
13	W10427633	Shield, Pulley Cover
14	357640	Screw
15	W10721967	Splutch Kit (60Hz)

OPTIONAL PARTS (NOT INCLUDED)

PAINT, TOUCH-UP (1/2OZ.)

Illus. No.	Part No.	Description
	72017	White

PAINT, PRESSURIZED SPRAY (12 OZ.)

Illus. No.	Part No.	Description
	350938	Gray Primer
	350930	White

PAINT, BULK (1 QT.)

Illus. No.	Part No.	Description
	799344	White (Uncut)

SEALER

Illus. No.	Part No.	Description
	285195	Sealer, Gasket (.20 Fl. Oz.) (6ml)

WATER SYSTEM PARTS

Illus. No.	Part No.	Description
	W10575888	Hose Fill Kit
	285834	Siphon Break Kit
	285835	Connector Assembly
	285863	4' Drain Hose w/Clamp
	3363920	Adapter, Standpipe 2" Diameter to 1" Diameter
	350008	Hose, Inlet (10')
	76314	Hose, Inlet (6' Hose With Elbow)

ACCESSORY PARTS

Illus. No.	Part No.	Description
	W10135699	Affresh Odor Remover
	8212526	Washer, Drip Tray
	W10355010	Cleaner, Kitchen & Appliance
	W10576550	Main Top Rear Support